

MATERIAL SAFETY DATA SHEET

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SRM Number: 3006
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SRM Name: Carbon Tetrachloride
in Methanol

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Carbon Tetrachloride in Methanol

Description: SRM 3006 consists of two 5-milliliter sealed borosilicate glass ampoules, each containing approximately 2.5 mL of a solution of carbon tetrachloride in methanol.

Other Designations: Carbon Tetrachloride (perchloromethane, tetrachloromethane; benzinoform; carbon chloride (CCl₄); methane, tetrachloro-) in Methanol (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol)

Name	Chemical Formula	CAS Registry Number
Methanol	CH ₃ OH	67-56-1
Carbon Tetrachloride	CCl ₄	56-23-5

DOT Classification: Methanol; UN1230; Packing Group II; Hazard Class 3.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methanol	99	OSHA TWA: 260 mg/m ³ (200 ppm)
		NIOSH recommended TWA (skin): 260 mg/m ³ (200 ppm) (10 h)
		NIOSH recommended STEL (skin): 325 mg/m ³ (250 ppm)
		UK WEL TWA (skin): 266 mg/m ³ (200 ppm)
		UK WEL STEL (skin): 333 mg/m ³ (250 ppm)
		Human, Inhalation TC _{LO} : 86 000 mg/m ³
		Human, Oral LD _{LO} : 143 mg/kg
		Man, Oral TD _{LO} : 3 429 mg/kg
Carbon Tetrachloride	1	OSHA TWA: 10 ppm
		OSHA TWA (ceiling): 25 ppm
		OSHA TWA (peak): 200 ppm (5 min in any 4 h)
		ACGIH TWA (skin): 5 ppm
		ACGIH STEL: 10 ppm
		NIOSH recommended STEL: 12.6 mg/m ³ (2 ppm), 60 min
		UK OES TWA (skin): 13 mg/m ³ (2 ppm)
		Rat, Oral: LD ₅₀ : 4 988 mg/kg
		Man, Inhalation TC _{LO} : 20 ppm
		Human, Inhalation LC _{LO} : 1000 ppm
		Man, Oral LD _{LO} : 429 mg/kg
		Man, Oral TD _{LO} : 1 700 mg/kg

Carcinogenic, Tumorigenic, Mutagenic Data: Carbon Tetrachloride has been investigated as a carcinogenic, tumorigenic, reproductive, and mutagenic effector. Methanol has been investigated as a mutagenic and reproductive effector.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methanol	Carbon Tetrachloride
Appearance and Odor: a clear, colorless liquid with a characteristic alcoholic odor	Appearance and Odor: a clear, colorless liquid with a distinct odor
Relative Molecular Mass: 32.04	Relative Molecular Mass: 153.82
Density: 0.7914 g/m ³	Density: 1.5940 g/m ³
Boiling Point: 65 °C (149 °F)	Boiling Point: 77 °C (171 °F)
Freezing Point: -94 °C (-137 °F)	Freezing Point: -23 °C (-9 °F)
Vapor Pressure (@ 20 °C): 97.25 mmHg	Vapor Pressure (@ 20 °C): 91.3 mmHg
Evaporation Rate (butyl acetate = 1): 4.6	Evaporation Rate (butyl acetate = 1): 12.8
Viscosity (@ 20 °C): 0.59 cP	Viscosity: not available
Solubility in Water: soluble	Solubility in Water (@20 °C): 0.08 %
Solvent Solubility: soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, and most organic solvents	Solvent Solubility: soluble in alcohol, benzene, chloroform, ether, carbon disulfide, acetone, petroleum ether, naphtha, and volatile oils

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this methanol/carbon tetrachloride solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Methanol

Flash Point: 11 °C

Method Used: Closed Cup

Autoignition Temperature: 385 °C

Flammability Limits in Air (Volume %):

UPPER: 36

LOWER: 6.0

Carbon Tetrachloride

Flash Point: Not applicable.

Method Used: Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air (Volume %):

UPPER: Not applicable.

LOWER: Not applicable.

Unusual Fire and Explosion Hazards: Methanol is a severe fire hazard when exposed to heat or flame. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor and air mixtures are explosive. Carbon tetrachloride is a negligible fire hazard.

Extinguishing Media: Use alcohol-resistant foam, dry chemical, carbon dioxide, or water spray.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X **Stable** **Unstable**

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Avoid contact with the skin. Do not allow the material to contaminate water sources.

Incompatibility (Materials to Avoid): This material is incompatible with halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, amines, acids, and bases.

See Section IV: "Unusual Fire and Explosion Hazards".

Hazardous Decomposition or Byproducts: Thermal decomposition products may include toxic oxides of carbon, halogenated compounds, and various organic fragments.

Hazardous Polymerization: **Will Occur** X **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X **Inhalation** X **Skin** X **Ingestion**

Methanol: Methanol is a skin and eye irritant and can cause nerve damage. This material is harmful if inhaled or absorbed through skin. Ingestion may be fatal or cause blindness. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause damage to the eyes, liver, heart, and kidneys. Methanol may also cause gastrointestinal disturbances and convulsions.

Carbon Tetrachloride: Carbon tetrachloride may be harmful by inhalation, ingestion, or skin absorption. Eye contact of carbon tetrachloride as a liquid or vapor may cause irritation and minor conjunctival injury. Skin contact with the liquid may cause pain. Absorption through the skin may cause effects similar to acute inhalation. Acute exposure by inhalation may cause irritation. Exposure to 25 ppm to 117 ppm can cause nausea, headache, dizziness, narcosis, restricted vision, and liver damage. Unconsciousness, coma and death may occur at 1 000 ppm to 2 000 ppm /60 min to 90 min. Death may be due to respiratory arrest or circulatory collapse, or ventricular fibrillation. Repeated or prolonged exposure by inhalation may cause effects as in acute exposure. In rats, chronic inhalation produced benign and malignant liver tumors. Reproductive effects reported in animals include a decrease in fertility, embryotoxicity, fetotoxicity, and a moderate to marked degeneration of testicular germinal epithelium. Ingestion of carbon tetrachloride may cause effects as in acute inhalation.

Medical Conditions Generally Aggravated by Exposure: **Carbon tetrachloride** exposure may aggravate alcoholism. **Methanol** may cause eye disorders, kidney disorders, skin disorders, and allergies.

Target Organ(s) of Attack: Central nervous system (CNS). Kidneys. Liver.

Listed as a Carcinogen/Potential Carcinogen (Methanol):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> </u>	<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>	<u> X </u>
By the Occupational Safety and Health Administration (OSHA)	<u> </u>	<u> X </u>

Listed as a Carcinogen/Potential Carcinogen (Carbon Tetrachloride):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> X </u>	<u> </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> X </u>	<u> </u>
By the Occupational Safety and Health Administration (OSHA)	<u> </u>	<u> X </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

Ingestion: If ingested, obtain medical assistance immediately.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: DO NOT touch spilled material. Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Avoid heat, flames, sparks, and other sources of ignition. Stop the leak if one can do so without risk. Absorb small spills with sand or other non-combustible absorbent material, and place into containers for proper disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal. Methanol is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U154. Carbon tetrachloride is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U211, D019. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level: 0.5 mg/L.

Handling and Storage: Store and handle in accordance with all current regulations of standards. Keep methanol and carbon tetrachloride separated from incompatible substances. Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material. Methanol is subject to storage regulations U.S. OSHA 29 CFR 1910.106.

Sealed ampoules of SRM 3006 should be stored in the dark at temperatures between 10 °C and 30 °C. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Carbon Tetrachloride*, 16 September 2004.
MDL Information Systems, Inc., MSDS *Methyl Alcohol*, 16 June 2005.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material is given in the NIST Certificate of Analysis.